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Rana pipiens and *Rana onca* will snap at the head of a companion frog that has taken a worm that he was trying to capture, but she thinks it is probably not an exhibition of anger, but a desire to secure the disappearing worm. However this may be, it is certain that the butting *Rana virgatipes* in the above-mentioned case secured a great advantage over the other frog, for after "settling" his companion, he captured all of the insects.

WILLIAM T. DAVIS

Zoölogical Laboratory Notes.—In the form of loose leaves bound together so that they can be individually removed, T. H. Sheffer¹ has prepared a set of laboratory notes on about two dozen common animals. Such notes are usually so arranged as to excite in the student a desire to study the material before him; this set described rather fully what he "ought" to see and is well calculated to kill any real growing interest he may have. The author thinks the notes should commend themselves to teachers "by reason of certain special advantages and a simple and rational treatment in general."

Notes.—*Circulatory Organs of Diotocardian Gastropods.* The study of the heart of the diotocardians by Spillmann ("Zur Anatomie und Histologie des Herzens und der Hauptarterien der Diotocardier." *Jen. Zeitschr. f. Naturwiss.*, vol. 40, pp. 537-538, pls. 19-21) justifies the separation of the Rhipidoglossa from the Docoglossa. In the Rhipidoglossa the pericardial chamber is penetrated by the intestine, and there are two auricles. While the auricles are thin-walled and deficient in muscle, the ventricle has a thick muscular wall of three layers. The openings from the auricles to the ventricle are guarded by lamellar valves. In the Docoglossa the intestine does not penetrate the pericardial chamber, and only the left auricle is present. This has the same structure as in the Rhipidoglossa, but the ventricle of the Docoglossa shows only two of the three layers seen in the Rhipidoglossa. In the Docoglossa the opening from the auricle into the ventricle is provided with a tubular valve. *Nerita* forms an interesting transition between these two groups so far as the structure of its heart is concerned. It may be called a docoglossan with a penetrated pericardial chamber or a rhipidoglossan with lamellar valves.

Goblet Cells in the Epidermis of Fishes. According to Oxner

¹Scheffer, T. H. *The Loose Leaf System of Laboratory Notes.* P. Blakiston's Son & Co., Philada., 1906, 112 pp.

("Ueber die Kolbenzellen in der Epidermis der Fische." *Jen. Zeitschr. f. Naturwiss.*, vol. 40, pp. 589-646, pls. 22-26) goblet cells occur in the epidermis of cyclostomes and most physostomous teleosts. All goblet cells are modified epithelial cells from the deepest or germinal layer of the epidermis. They are undoubtedly specialized unicellular glands which may have in addition some supporting function.

The Selachian Eye. From a study of the eyes of some eighteen species of sharks and rays Franz ("Zur Anatomie, Histologie, und functionellen Gestaltung des Selachierauges." *Jen. Zeitschr. f. Naturwiss.*, vol. 40, pp. 697-840, pl. 29), has shown that while there are many specific differences, the eyes of this group as a whole are clearly distinguishable from those of other vertebrates. What is especially peculiar in them is the tapetum lucidum, an epithelial musculature in the iris instead of the usual mesodermal one, a specialized zonula zinnii, and the absence of a falciform process characteristic of other fishes. The adaptations shown by the eyes of different species are discussed at some length.

G. H. P.

BOTANY

Bergen and Davis's Principles of Botany.¹ — One of the most successful American elementary botanical text-books has been Bergen's *Foundations of Botany*. With its author, Dr. Davis has been associated in the preparation of the present book, which is certain to find favor with the users of its predecessor and to win many new friends since in addition to what was best in the earlier text there is now given a consecutive series of studies of representative spore plants so treated as to outline the evolutionary history of the plant world. Both authors are experienced teachers, and also familiar with research problems at first hand, and they have brought to their task unusual care in grouping and handling the subject matter and in well illustrating it.

The book is said to furnish material for a full year's work. It contains, indeed, enough to occupy considerably more than this time,

¹ Bergen, J. Y., and Davis, B. M. *Principles of Botany*. Boston, Ginn & Co., 1906. 12mo, ix + 555 pp., 14 pl., 402 figs.